

REMARKS/ARGUMENTS

Favorable reconsideration of this Application, as presently amended and in light of the following discussion, is respectfully requested.

This Amendment is in response to the Office Action mailed on March 24, 2005. Claims 1-20 are pending in the Application, Claims 1, 3, 5-7, and 10 stand rejected, and Claims 2, 4, 8, and 9 stand objected to as being dependent upon rejected base claims, but would be allowed if rewritten in independent form. Claims 5 and 10 were identified as allowable if rewritten to overcome the rejection under 35 U.S.C. § 112. Claims 1, 3, 5-8, and 10 are amended and new Claims 11-20 are added by the present Amendment.

The indication of allowable subject matter is noted with appreciation. However, since Applicants consider that Claims 1 and 6, from which Claims 2, 4, 5, and 8-10 depend, define patentable subject matter, Claims 2, 4, 5, and 8-10 are maintained in dependent form at the present time.

Summarizing the outstanding Office Action, the abstract, the specification, and Claims 7 and 8 were objected to because of informalities; Claims 5 and 10 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite; Claim 3 was rejected under 35 U.S.C. § 102(b) as being anticipated by Partington (U.S. Patent 4,460,316); and Claims 1, 6, and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Partington in view of Carta (U.S. Patent 3,400,912).

As to the objections to the abstract, the specification, and Claims 7 and 8, Applicants note with appreciation the time taken by the Examiner to identify specific areas needing revisions. Applicants have herein submitted amendments to the abstract, specification, and Claim 7 and 8 in order to correct the outstanding informalities and respectfully request reconsideration of the same.

As to the rejections of Claims 5 and 10 under 35 U.S.C. § 112, second paragraph, Applicants again note with appreciation the time taken by the Examiner to identify specific

areas needing revisions. Applicants believe that the enclosed amendments to Claims 5 and 10 have overcome the rejection under 35 U.S.C. §112 and respectfully request its withdrawal.

In view of the present amendment, it is believed that all pending claims are definite and no further rejection on that basis is anticipated. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned, who will be happy to work with the Examiner in a joint effort to derive mutually acceptable language.

As to the outstanding anticipation rejection, Applicants respectfully submit that Claim 3 is not anticipated by Partington because each and every element as set forth in that claim is not found, either expressly or inherently described, in the cited reference. In an anticipation rejection, the identical invention must be shown in as complete detail as is contained in the claim.¹

According to a feature of the invention as set forth in presently amended Claim 3, a method of adjusting the resonant frequency of a moving blade insert for a turbomachine turbine having a rotor and a plurality of inserts having at least two blades interconnected by common inner and outer platforms and sharing a common root is recited. The recited method, comprises, among other features, *adjusting the resonant frequency of the insert by adjusting the configuration of a recess in the insert root, the formed recess remaining free after connection of the insert to the rotor.*

As disclosed in the Specification, limited options to correct the problem of undesirable vibrations in turbines exist by modifying the blade shape because of the stringent aerodynamic, weight, and size constraints.² One of the many advantageous objects of the instant invention is a method for adjusting the resonant frequency of a turbine blade insert without penalizing it from the point of view of its aerodynamic characteristics or its weight

¹ See MPEP 2131: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference," (Citations omitted) (emphasis added). See also MPEP 2143.03: "All words in a claim must be considered in judging the patentability of that claim against the prior art."

² See, Specification, page 1, lines 19-29.

and without introducing complication in mounting blade inserts or in building the rotor.³

Such non-limiting advantageous characteristics are accomplished with a free recess, i.e., a recess that remains free after connection of the insert to the rotor. Claim 3 has been amended to more clearly recite such a method to control the vibrations in a turbomachine.

In the outstanding Office Action it is asserted that in Partington “the resonant frequency of the insert is adjusted by forming a recess 27, 28, 29 in the insert root.”

Applicants respectfully disagree.

Partington discloses “a group of multiple rotatable blades 1 pinned to a disc 3 on the shaft 5 of an axial flow turbine.”⁴ “Three holes 27, 28 and 29 extend axially through the root portion and through the disc 3 and cooperate with pins 31 to fasten each blade group 1 to the disc 3.”⁵ Partington specifically discloses that the “blade groups hereinbefore described have high rigidity and coupled with the high dampening provided by the pin joint, the thin platform and thin shroud provide a minimum vibratory response for a maximum number of vibration frequencies and allow the blade group to withstand high vibratory excitation.”⁶

Based on the teachings of Partington, as just summarized, Applicants respectfully submit that the resonant frequency of the insert is not adjusted by forming a recess 27, 28, 29 in the insert root, as asserted in the outstanding Office Action. This is so because the holes 27, 28, 29 formed in the root portions have the mere function of allowing connection with the disc 3 by receiving the axial pins 31. There is no disclosure or even suggestion in Partington that the holes be particularly configured in order to adjust the resonance frequency of the blade group. In addition, the dampening effect mentioned by Partington results from the

³ *Id.*, page 2, lines 6-12.

⁴ Partington, col. 1, lines 48-51.

⁵ *Id.*, col. 2, lines 18-21.

⁶ *Id.*, col. 2, lines 28-34.

particular connection provided, namely from the engagement of the pins 31 within the holes 27, 28, and 29.

By contrast, in the method of Claim 3, a recess is formed having no role for connecting the root to the rotor, the configuration of the recess being adjusted in order to adjust the resonance frequency. Claim 3 is amended to emphasize this point, by referring to a “free” recess, namely a recess that remains free after connection to the rotor and continues to fully achieve its function as resonance frequency adjusting means.

Consequently, Applicants respectfully submit that presently amended Claim 3 is not anticipated by Partington. The device disclosed by Partington cannot be used to perform a method of adjusting the resonant frequency of a moving blade by adjusting the configuration of a free recess in the root of an insert, the recess remaining free after connection of the insert to the turbine’s rotor. Therefore, Applicants respectfully request that the anticipation of Claim 3 under 35 U.S.C. §102(b) be withdrawn.

Turning to the obviousness rejection, Applicants respectfully submit that Partington and Carta, neither individually nor in any combination, support a *prima facie* case of obviousness of the invention recited in Claims 1 and 6. This is so because, even when combined, these references do not teach or suggest all the claimed features.

Claims 1 and 6 also recite blade inserts having recesses in their roots whose configurations are adjusted in order to adjust the resonant frequency of moving blades, the recess remaining free after the blade inserts are connected to each rotor. The failure of Partington to teach or disclose such feature has already been discussed above in conjunction with the anticipation rejection of Claim 3. The outstanding Office Action further acknowledges that Partington fails to disclose inserts belonging to the same wheel that are voluntarily given different configurations for the recesses in their roots (as applied to Claim 1) and respective recesses presenting configurations that differ so that the inserts have resonant frequencies that are significantly different (as applied to Claim 6). Carta has been

cited for assertedly disclosing the recited features acknowledged as missing in Partington.

Applicants respectfully disagree.

Carta⁷ relates to a problem of self induced vibrations with single blades connected to a rotor by pinned roots using a plurality of different mechanical configurations. As shown in the Table of Variants in Carta at the bottom of col. 6, all possible variants disclosed are related to the pin/hole configuration at the level of the connection between the root and the rotor. Therefore, applying the teaching of Carta to Partington could only result in varying the radial location of holes 27, 28, 29 and pins 31 or the holes and pins sizes or the clearances between holes and pins in the primary reference, between different blade groups. No teaching can be derived from Carta to adjust the resonance frequency by forming into the root a recess of selected configuration that will remain free after connection of the root to the rotor, in other words, by forming a recess having no relation with the connection of the root to the rotor. As such, Carta does not remedy the above-noted deficiency related to the recited features of Claims 1 and 6.

It is therefore believed that Partington and Carta, neither individually nor in any combination, render Claims 1 and 6 obvious. Claim 7 depends from Claim 6. Based at least on the foregoing, Applicants respectfully request that the rejection of Claims 1, 6, and 7 under 35 U.S.C. § 103(a) be withdrawn.

Finally, Applicants have submitted new Claims 11-20, which find non-limiting support in the subject matter originally disclosed as follows: (1) as to Claims 11-17, on page 6, lines 3-9, page 10, lines 1-4, and the originally filed figures; (2) as to Claim 18, on page 7, lines 1-14; (3) as to Claim 19, on page 6, lines 15-23; and (4) as to Claim 20, on page 6, lines 15-27. Therefore, new Claims 11-20 are not believed to raise a question of new matter.⁸

⁷ This reference corresponds to FR 1,578,562 cited in page 1, line 30 of Applicant's specification.

⁸ See MPEP 2163.06 stating that "information contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter."

Claims 11-17 recite, among other features, the shape (bulb or Christmas tree) of the root allowing connection to the rotor by axial engagement in a housing of complementary shape formed in the periphery of the rotor. Such a feature further distinguish the invention recited in Claim 11-17 from Partington and Carta, which show a connection of the “pinned root” type between the roots and the rotor disc. Carta specifically taught that the rotor disclosed is specifically directed to pinned-root blade machines.⁹ Thus, Carta cannot objectively be held as relevant in connection with the problem of avoiding vibration caused by resonance phenomena with “fir-tree” type of roots.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-20 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representatives at the below listed telephone number.

Respectfully submitted,

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⁹ Carta, col. 1, line 65 – col. 2, line 15.